What is claimed is:

1. A tunable sampled-grating distributed feedback laser diode provided with a first gain region and a second gain region adjacent to each other, comprising:

a first SG-DFB structure member formed thereon a first phase control region between first sampled-gratings and the first sampled-gratings having a first period formed on the first gain region; and

a second SG-DFB structure member formed thereon a second phase control region between second sampled-gratings and the second sampled-gratings having a second period formed on the second gain region, wherein the tunable sampled-grating distributed feedback laser diode tunes the wavelength of laser generated in response to a reflection change of the first and the second phase control regions.

2. The tunable sampled-grating distributed feedback laser diode as recited in claim 1, wherein a period of the first sampled-grating is equal to that of the second sampled-grating.

3. The tunable sampled-grating distributed feedback laser diode as recited in claim 1, wherein reflection changes of the first phase control region and the second phase control region are obtained by changing the amount of current applied to the first phase control region and the second phase control

region, respectively.

4. The tunable sampled-grating distributed feedback laser diode as recited in claim 1, wherein a wavelength of the oscillating laser is incontinuously changed by varying the reflective indexes of the first phase control region or the second phase control region.

5. The tunable sampled-grating distributed feedback laser diode as recited in claim 1, wherein a wavelength of the oscillating laser is continuously changed by varying the reflective indexes of the first phase control region and the second phase control region in the same size.

6. An optical communication device is characterized in that an optical modulator or a semiconductor optical amplifier together with the tunable sampled-grating distributed feedback laser diode is integrated into a semiconductor substrate,

wherein the tunable sampled-grating distributed feedback laser diode provided with a first gain region and a second gain region adjacent to each other, includes:

a first SG-DFB structure member formed thereon a first phase control region between first sampled-gratings and the first sampled-gratings having a first period formed on the first gain region; and

a second SG-DFB structure member formed thereon a

second phase control region between second sampled-gratings and the second sampled-gratings having a second period formed on the second gain region, wherein the tunable sampled-grating distributed feedback laser diode tunes the wavelength of laser generated in response to a reflection change of the first and the second phase control regions.

7. A tunable sampled-grating distributed feedback laser diode for tuning a wavelength of an oscillating laser, comprising:

a substrate provided with a first region and a second region adjacent to each other;

a wave guide layer formed on the first region and the second region of the substrate;

a multiple quantum well active layer formed in the wave guide layer by a predetermined distance for providing a plurality of phase control regions;

a first sampled-grating region having a first period and the phase control region formed between the sampled-grating;

a second sampled-grating region having a second period and the phase control region formed between the sampled-grating;

a clad layer formed on the wave guide layer;

a first phase control electrode formed on the clad layer of the first region for supplying a current to the phase

control region of the first region;

a second phase control electrode formed on the clad layer of the second region for supplying a current to the phase control region of the second region;

a first gain region electrode formed on the clad layer of the first region for supplying a current to the wave guide layer except the phase control region of the first region; and

a second gain region electrode formed on the clad layer of the second region for supplying a current to the wave guide layer except the phase control region of the second region.

8. The tunable sampled-grating distributed feedback laser diode as recited in claim 7, wherein a period of the first sampled-grating and a period of the second sampled-grating are configured different from each other and periods of diffraction gratings of the first and the second sampled-gratings are constructed identically.

9. The tunable sampled-grating distributed feedback laser diode as recited in claim 7, wherein the substrate is an n type InP substrate, the wave guide layer is made of a material such as InGaAsP and the clad layer is a p type InP.

10. The tunable sampled-grating distributed feedback laser diode as recited in claim 7, wherein a wavelength of the oscillating laser is incontinuously changed by varying a reflective index of the phase control region of the first

region or the phase control region of the second region.

11. The tunable sampled-grating distributed feedback laser diode as recited in claim 7, wherein a wavelength of the oscillating laser is continuously changed by simultaneously varying the reflective indexes of the phase control region of the first region and the phase control region of the second region.

12. An optical communication device is characterized in that an optical modulator or a semiconductor optical amplifier together with the tunable sampled-grating distributed feedback laser diode is integrated on a semiconductor substrate,

wherein the tunable sampled-grating distributed feedback laser diode includes:

a substrate provided with a first region and a second region adjacent to each other;

a wave guide layer formed on the first region and the second region of the substrate;

a multiple quantum well active layer formed in the wave guide layer by a predetermined distance for providing a plurality of phase control regions;

a first sampled-grating region having a first period and the phase control region formed between the sampled-grating;

a second sampled-grating region having a second period and the phase control region formed between the

sampled-grating;

a clad layer formed on the wave guide layer;

a first phase control electrode formed on the clad layer of the first region for supplying a current to the phase control region of the first region;

a second phase control electrode formed on the clad layer of the second region for supplying a current to the phase control region of the second region;

a first gain region electrode formed on the clad layer of the first region for supplying a current to the wave guide layer except the phase control region of the first region; and

a second gain region electrode formed on the clad layer of the second region for supplying a current to the wave guide layer except the phase control region of the second region.